The flat roof, an overlooked resource

Protecting the waterproofing — bitumen and steel deck alike — and turning thousands of exposed m² into an asset for comfort and energy

Industry, logistics, retail, agriculture, large residential blocks: Switzerland has millions of m² of flat roofs. Dark, they bake in summer, age prematurely and produce nothing. A thin reflective layer changes the equation — on two fronts.

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A large, light and reflective industrial flat roof, an ideal support for photovoltaics: less overheating, preserved waterproofing and energy as a bonus. (AI-generated image)

We rarely notice them, yet they cover a considerable share of the Swiss building stock. Industrial and logistics halls, retail premises, agricultural buildings, residential blocks: the flat — or low-pitch — roof is everywhere. Two main families dominate: **bituminous membranes** and **steel-deck roofs**. Both share the same blind spot: exposed to full sun, most often dark, they take the hit without sending anything back. And that has a cost — for the building and for those who work beneath it.

Black bitumen, a heat trap

A dark bituminous membrane can reach, in high summer, surface temperatures of around **70 to 80 °C**. At that level, the material expands, contracts at night, then starts again — day after day, season after season.

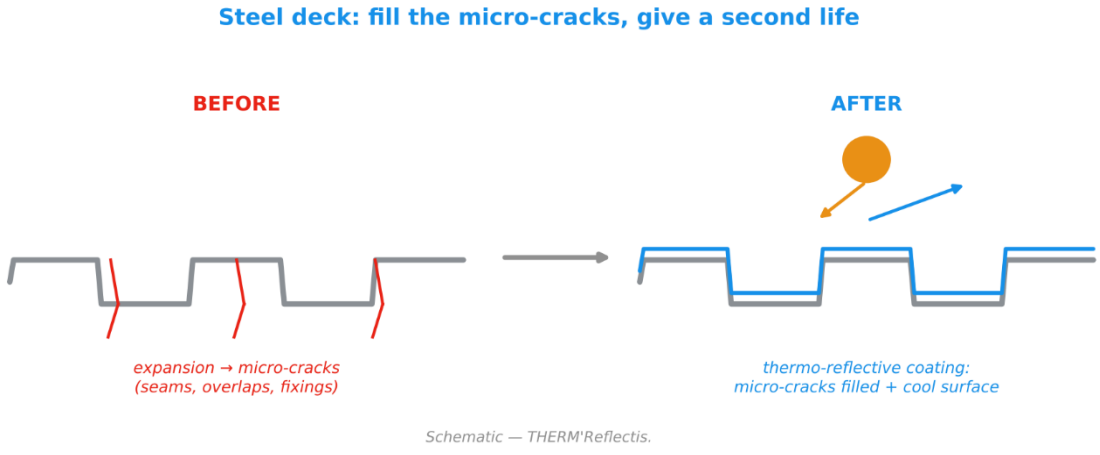
This constant cycle fatigues the waterproofing: the bitumen hardens, loses its oils, cracks and ends up ageing well before its time. Meanwhile, the absorbed heat passes through the roof and makes the top floors barely bearable.

Steel deck: light, but sensitive to expansion

Steel decking has other qualities — fast installation, light weight, long spans — but it shares this sensitivity to heat. The metal works enormously under temperature swings. The result: after **just fifteen years or so**, a steel-deck roof may already show signs of ageing. **Micro-cracks** appear at the sensitive points — seams, overlaps, fixings — and become so many potential entry points for water. Applying a thermo-reflective coating both fills these micro-cracks and limits the thermal shocks that cause them: a genuine second life for the roof.



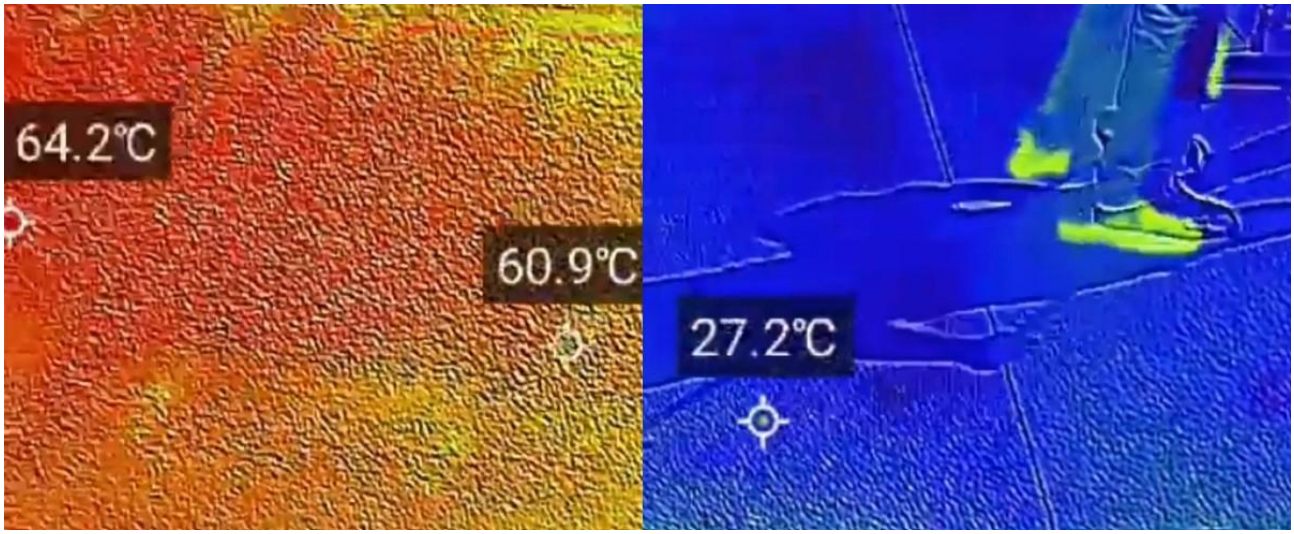
On the Vaud Riviera: a steel-deck roof of an urban building, after about fifteen years. The many repair patches along seams and ribs betray the cracks born of thermal expansion — as many points to treat before they turn into leaks. (photo THERM'Reflectis, 18.07.2024)



On steel decking, the thermo-reflective coating fills the micro-cracks caused by expansion and sends radiation back: the envelope stays cooler and works less. (For open cracks or degraded seams, suitable preparation is still required beforehand.)

Two problems, one and the same answer

Whether bitumen or steel deck, the principle is identical: instead of absorbing solar radiation, you *send it back*. A certified thermo-reflective coating, with a high solar-reflectance index, keeps the surface markedly cooler. Two benefits follow at once: the envelope undergoes far fewer thermal shocks — so it ages more slowly — and the premises under the roof gain in comfort, with no extra air-conditioning.



Same sun, same roof: on the left, the dark surface stores the heat (up to ~80 °C) and transmits it to the building; on the right, the surface treated with a thermo-reflective coating sends it back and stays cool.

Extend rather than redo

Faced with waterproofing showing signs of fatigue, the reflex is often a heavy overhaul. Yet when the support is still broadly sound, *extending* beats redoing: a thermo-reflective treatment slows the ageing of the membrane or the deck, pushes back the deadline for a full renovation and avoids the strip-and-replace. The upshot: contained costs and **embodied carbon** saved — the least polluting material being the one you don't need to produce or dispose of.



One and the same thin layer fulfils two functions: protecting the existing waterproofing and adding value to the surface (comfort and energy) — while saving costs and embodied carbon. (Photo THERM'Reflectis, 23.07.2026; Applicators: TAGAN Peinture SA)

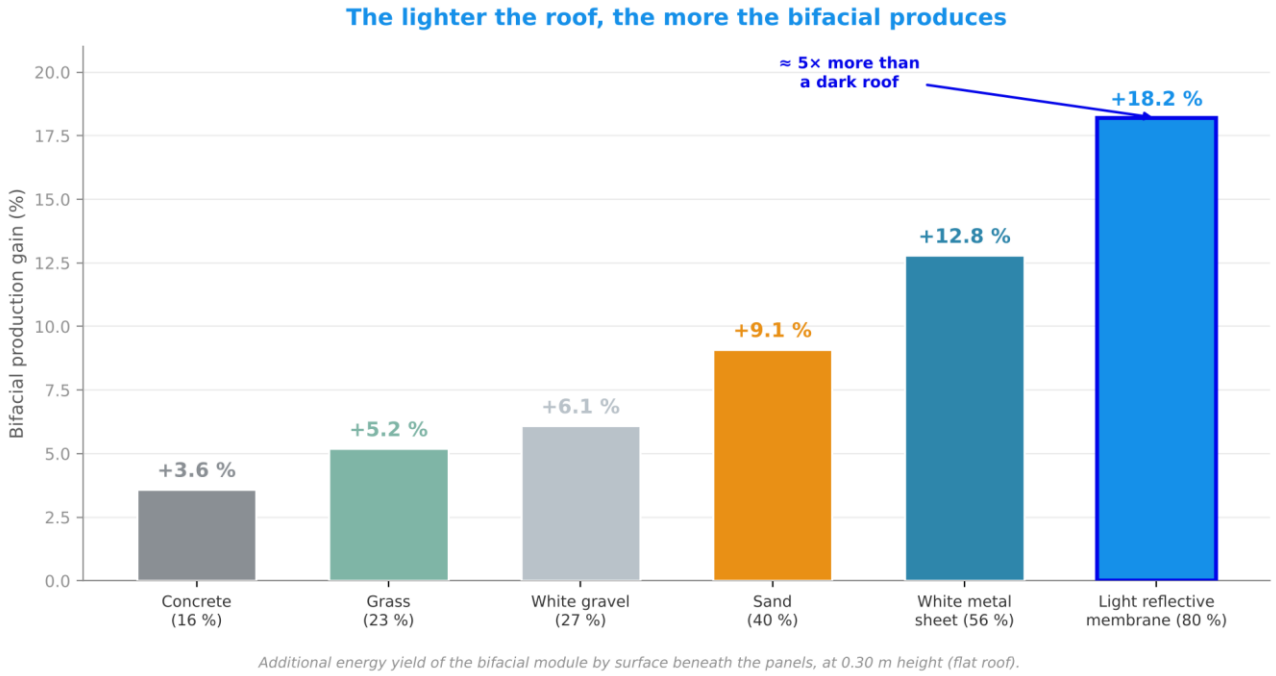
A controlled and standards-compliant application

Lasting effectiveness depends first on the rigour of the application. The support is carefully cleaned and prepared — a decisive step on bitumen, whose oily nature calls for specific treatment. Then comes a two-stage system: a bonding primer, then the thermo-reflective coating applied in cross-coats, in dry and mild weather. Correctly applied, the solution offers a **service life of around ten years**, with light maintenance (periodic cleaning is enough to preserve the reflection). A common-sense caveat: areas of standing water, with insufficient slope, call for dedicated waterproofing rather than a mere coating.

The roof that pays: enter bifacial photovoltaics

A large, light flat roof is not only protected: it becomes a **productive asset**. Photovoltaic panels do not like heat: above 25 °C, they lose on the order of **0.3 to 0.4 % of power per additional degree**. In high summer, on a dark roof climbing to 70-80 °C, this penalty is far from trivial. A reflective surface, which stays markedly cooler, *limits this yield loss* at the very hours when production matters most. Better still: a **bifacial** panel installed above a high-albedo roof captures, through its rear face, the radiation sent back by the support — a “free” production bonus.

The best time to think about it is **at the design stage**. Treating the roof before — or at the same time as — installing the modules, and designing the layout to exploit the albedo, means thinking in terms of a *system* (waterproofing + reflection + production) rather than stacked layers. The resource that lay dormant then starts to pay, in comfort as in kilowatt-hours.



Additional energy yield of a bifacial photovoltaic module according to the nature of the surface beneath the panels, at 0.30 m height (typical flat-roof configuration). On a light, reflective membrane (80 % albedo), the production boost reaches +18.2 % — nearly five times more than on a dark support. Source: SolarWorld AG / Institute for Solar Energy Research Hamelin (ISFH), Table 3.

A productive — and resilient — roof

Beyond yield, it is the building's robustness that is at stake. An envelope that stays cool means fewer summer peaks in electricity demand, when air-conditioners all run together and put the grid under strain. It also means **more stable photovoltaic production during a heatwave**, precisely when it is needed

most. And it means waterproofing that ages more slowly, hence a building that better withstands summers set to grow hotter. Protect, produce, endure: the same thin layer serves all three goals at once.

For whom, concretely?

Candidates abound: industrial halls and logistics platforms, shopping centres and large retail surfaces, agricultural buildings, residential blocks with terrace roofs, and of course the public stock — schools, depots, sports halls. Wherever vast dark surfaces bake in the sun without producing anything, the same opportunity waits to be revealed.

Sources: *THERM'Reflectis application data and field feedback (bituminous and steel-deck roofs) · Surface temperatures of dark membranes in summer (usual orders of magnitude) · SolarWorld AG & Institute for Solar Energy Research Hamelin (ISFH), "Calculating the Additional Energy Yield of Bifacial Solar Modules" (yield by albedo, Table 3). Partner suppliers: KOKUN Swiss SA (kokun.ch), RENOVCOAT (renovcoat.com), THERMACOTE (thermacote.com).*

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> *Every degree gained makes a difference.*
> *Every project contributes to a more sustainable future.*

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